Effective Date: 2007-2008

Hamburg Area School District

Name of Course: Algebra 3/ Trigonometry
Department: Mathematics

Grade Level: 11-12

Instructional Time: 43 minutes
Length of Course: 1 year
Period Per Cycle: 6
Length of Period: 43 minutes

Texts and Resources: Algebra and Trigonometry, Fifth Ed.
Larson, Hostetler

Assessments: Tests, Quizzes, Homework, Projects

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 1: Real Numbers **Time Line: 2 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Sets of numbers	Represent and classify real numbers. Draw a Venn Diagram to show the relationships between the sets of numbers.	M11.A.1.3.1
Interval notation	Use inequality notation. Translate from inequality to interval notation and vice versa. Classify intervals by type.	2.8.11.H
Absolute value and distance	Evaluate absolute value expressions. Understand the definition of *absolute value.* Find the distance between two points on a number line. Use the properties of absolute value. Understand absolute value as a distance or magnitude.	M11.D.2.1.1, 2.1.11.A M11.C.3.1.1 2.1.11.A 2.1.11.A
Properties of Algebra	Recognize and use properties of Algebra. Recognize and use properties of equality. Recognize and use the zero-product (factor) property.	2.1.8.B

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 2: Exponents and Radicals **Time Line: 3 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Exponents	Review the properties of exponents. Simplify and/or evaluate expressions involving exponents.	M11.A.2.2.2 M11.A.2.2.2
Roots of real numbers	Simplify radicals with various indices. Use a calculator to approximate roots.	M11.A.2.2.1 M11.A.1.1.1
Radical expressions	Simplify radical expressions. Rationalize the denominator. Perform operations on radical expressions.	M11.A.1.1.3, M11.A.2.2.1 M11.A.1.1.3 M11.A.1.1.3
Rational exponents	Write expressions with rational exponents in simplest radical form. Rationalize the denominator.	M11.A.2.2.1, M11.A.2.2.2 M11.A.2.2.1

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 3: Review of Factoring **Time Line: 1/2 week**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Factoring	Factor polynomials using GCF.	M11.D.2.2.2, M11.A.1.2.1
	Factor $x^2 + bx + c$.	M11.D.2.2.2
	Factor $ax^2 + bx + c$ where $a \neq 1$.	M11.D.2.2.2
	Factor special products.	M11.D.2.2.2
	Factor polynomials using the grouping method.	M11.D.2.2.2

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 4: Graphical Representation of Data **Time Line: 3 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Cartesian plane	Review vocabulary.	2.8.11
Distance and midpoint	Memorize, use, and apply the distance and midpoint formulas.	M11.C.3.1.1
Scatter plots	Use a scatter plot to model and solve real-life problems.	M11.D.1.1.1, M11.E.1.1.1, M11.E.4.2.1, M11.E.4.2.2
Graphs of equations	Sketch a variety of equations, such as linear, quadratic, absolute value, polynomial, circular, and square root, using point-plotting. Classify the basic shape of a graph given its equation. Locate x- and y-intercepts. Test a graph/equation for symmetry. Use graphs of equations in real-life problems.	2.8.11.N, 2.8.11.T 2.8.11.T 2.8.11.K M11.D.2.1.3

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 5: Linear Equations in One Variable **Time Line: 3 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Types of equations	Identify equations as conditional or identity. Recognize equivalent equations.	2.8.11.D 2.8.11
Solving linear equations in one variable	Determine whether a value is a solution to an equation. Use various transformations to solve equations. Check for extraneous solutions.	2.8.11 M11.D.2.1.3 2.8.11.D
Solving word problems in one variable	Solve measurement, distance/rate/time, mixture, number, and interest problems.	2.8.11.D

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 6: Solving Quadratic Equations **Time Line: 3 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Solving quadratics	Solve quadratics by factoring.	M11.D.2.1.5
	Solve quadratics by extracting square roots.	
	Solve quadratics by completing the square.	M11.D.2.1.5
	Solve quadratics by the quadratic formula.	M11.D.2.1.5
	Use discriminants to determine the nature of the roots.	M11.D.2.1.5
	Graph quadratics.	M11.D.2.1.2
	Use quadratics to model and solve real-life problems.	2.8.11.D

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 7: Complex Numbers **Time Line: 1 week**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Complex numbers	Simplify square roots containing negative radicands.	M11.A.2.2.1
	Differentiate between pure imaginary numbers and complex numbers.	
	Perform operations on complex numbers.	M11.D.2.2.1
	Solve quadratic equations with imaginary solutions.	M11.D.2.1.5
	Rationalize the denominator.	M11.A.2.2.1

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 8: Equations and Inequalities **Time Line: 3 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Polynomial equations	Solve polynomial equations by factoring. Solve equations of quadratic type.	2.8.11.N 2.8.11.N
Equations involving radicals	Solve equations containing radicals. Solve radical equations.	2.8.11.J
Rational equations	Solve rational equations.	M11.D.2.2.3
Absolute value equations	Solve absolute value equations.	M11.A.2.2.1
Inequalities	Solve and graph linear inequalities. Describe the difference between *conjunction* and *disjunction*. Solve and graph inequalities involving absolute value. Use interval notation to show a solution.	M11.D.2.1.1 M11.D.2.1.1
Polynomial inequalities	Find critical numbers (zeros). Solve and graph polynomial inequalities.	2.11.11.B 2.8.11.N 2.8.11.J

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 9: Linear Equations in Two Variables **Time Line: 2 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Slope	Determine the slope of a line based on a graph.	M11.D.3.2.3
	Determine the slope of a line given two points.	M11.D.3.2.2
	Graph a line given a point and a slope.	M11.D.2.1.2
	Classify pairs of lines as parallel or perpendicular.	2.9.11.G
	Graph a line using slope-intercept form.	M11.D.2.1.2, M11.D.3.2.3
Writing linear equations	Write the equations of a line given its slope and y-intercept	2.8.11.L 2.8.11.M M11.D.3.2.2
	Write the equations of a line given a slope and a point.	M11.D.3.2.2
	Write the equations of a line given two points.	M11.D.3.2.2
	Write equations of lines given various information.	M11.D.3.2.2
	Write the equation for a line of best fit for a scatter plot.	M11.E.1.1.1, M11.E.4.2.1, M11.E.4.2.2
	Write the slope-intercept form of a line given its graph.	M11.D.3.2.2

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 10: Functions and Relations **Time Line: 4 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Relations and Functions	Identify relations and functions Graph relations and functions. Evaluate functions. Find the domain and range of a function given its graph or equation.	M11.D.1.1.2 M11.D.4.1.1 M11.A.2.2.1 M11.D.1.1.3
Graph analysis	Use the vertical line test. Determine the zeros of a function. Determine the relative extrema of a function. Determine intervals of increase or decrease. Identify and graph linear, step, and piecewise-defined functions. Characterize a function as even or odd.	M11.D.1.1.2 2.11.11.A 2.8.11.N 2.11.11.B 2.11.11.B M11.D.2.1.2, M11.D.4.1.1
Transformations of graphs	Recognize graphs of common functions. Use vertical and horizontal shifts to sketch graphs. Use reflections to sketch graphs. Use nonrigid transformations to sketch graphs.	M11.D.2.1.2, M11.D.4.1.1 M11.D.2.1.2, M11.D.4.1.1 M11.D.2.1.2, M11.D.4.1.1 M11.D.2.1.2, M11.D.4.1.1
Combinations of functions	Perform operations on functions. Find compositions of one function with another function.	2.8.11 2.8.11

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 11: Statistics **Time Line: 1/2 week**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Measures of central tendency or variation	Find mean, median, and mode. Find range and standard deviation. Describe how outliers affect measures of central tendency. Solve problems involving normally distributed data.	M11.E.2.1.1 M11.E.2.1.1, M11.E.2.1.2 M11.E.2.1.3 2.6.11.I
Graphs of data	Graph a box and whisker plot given data. Make a stem and leaf plot given data. Analyze data given a box and whisker plot or a stem and leaf plot.	M11.E.1.1.1 M11.E.1.1.1 M11.E.1.1.2, M11.E.4.1.2

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 12: Probability **Time Line: 3 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Fundamental Counting Principle	Apply the fundamental counting principle to solve problems.	M11.E.3.2.1
Permutations and combinations	Compute linear permutations. Compute permutations with repetitions. Solve problems involving combinations. Select the correct method to solve a problem.	M11.E.3.2.1 M11.E.3.2.1
Probability and odds	Find the probability of dependent and independent events. Determine the odds of success and failure of an event.	M11.E.3.1.1 2.7.11.E
Multiplying probabilities	Find the probability of two or more independent or dependent events.	2.7.11.E
Adding probabilities	Find the probability of mutually exclusive or inclusive events.	2.7.11.E

Hamburg Area School District
Curriculum

Course Name: Algebra 3/Trigonometry
Unit 13: Trigonometry **Time Line: 8 weeks**

Essential Question/ Content	Performance Objectives	Anchors/Standards
Angles and their measures	Use degree and radian measure. Convert between degree and radian measures. Recognize angles in standard position. Find arc length.	2.3.11.B, M11.B.2.1.1 2.3.11.B 2.9.11.F 2.10.11, M11.C.1.1.2
Trigonometric functions	Define trigonometric functions of acute angles. Use the fundamental trigonometric identities Use a calculator to find values of trigonometric functions. Use reference angles to evaluate trigonometric functions.	2.10.11.B, M11.C.1.4.1 2.10.11.B, M11.C.1.4.1 2.10.11.A 2.10.11.B
Graphing trigonometric functions	Use amplitude and period to sketch sine and cosine graphs. Sketch basic tangent and cotangent graphs. Sketch basic secant and cosecant graphs.	M11.D.4.1.1, M11.D.1.1.1, 2.10.11.A M11.D.4.1.1, M11.D.1.1.1, 2.10.11.A M11.D.4.1.1, M11.D.1.1.1, 2.10.11.A
Triangle trigonometry	Solve right triangles using SOH, CAH, TOA. Use the Law of Cosines and the Law of Sines. Solve general triangles using SSS, SAS, SSA, ASA, and AAS cases. Apply the triangle area formulas.	M11.C.1.4.1 2.10.11.A 2.10.11.B
Trigonometric identities	Simplify and prove trigonometric identities.	2.10.11.A